1.25Gb/s SFP BIDI TX-1490nm/RX-1550nm 80km Optical Transceiver

Features

- Up to 1.25Gbps data rate
- BIDI LC/UPC type pluggable optical interface
- 1490nm DFB laser transmitter and PIN photo-detector
- Hot- pluggable
- Up to 80km on 9/125μm SMF
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS-10 compliant and lead-free
- Support Digital Diagnostic Monitoring interface
- Single +3.3V power supply
- Compliant with SFF-8472
- Case operating temperature： 0 ~ +70℃

Applications

- Switch to Switch interface
- Gigabit Ethernet
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

Compliance

- SFP MSA
- SFF-8472
- IEEE802.3z
- RoHS

Description

The SFP-1G-U80-45 series single-mode transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA), The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the DFB laser and the PIN photo-detector .The module data link up to 80km in 9/125 μ m single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings

Parameter	Symbols	Min.	Max.	Unit	Notes
Storage Temperature	T_S	-40	85	°C	
Power Supply Voltage	V_{CC}	-0.3	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	TH_d	5		dBm	

Recommended Operating Conditions and Power Supply Requirements

Table2-Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_{OP}	0		+75	°C	
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Data Rate			1.25		Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			80	km	9/125 μ m

Electrical Characteristic

Tested under recommended operating conditions, unless otherwise noted

Table3-Electrical Characteristic

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Power Consumption	P			0.95	W	
Supply Current	Icc			300	mA	

Transmitter						
Single-ended Input Voltage Tolerance	V_{CC}	-0.3		4.0	V	
Differential Input Voltage Swing	Vin,pp	200		2400	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	
Transmit Disable Assert Time				5	us	
Transmit Disable Voltage	Vdis	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	Ven	Vee-0.3		0.8	V	
Receiver						
Differential Output Voltage Swing	Vout,pp	500		900	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	
Data output rise/fall time	Tr/Tf		100		ps	20% to 80%
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	
LOS De-assert Voltage	VlosL	Vee-0.3		0.8	V	

Optical Characteristic

Table4-Optical Characteristic

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	1470	1490	1510	nm	
Spectrum Bandwidth(RMS)	σ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	P_{AVG}	0		5	dBm	1
Optical Extinction Ratio	ER	9			dB	
Transmitter OFF Output Power	POff			-45	dBm	
Transmitter Eye Mask	Compliant with 802.3z(class 1 laser safety)					2
Receiver						
Center Wavelength	λ_C	1530	1550	1570	nm	
Receiver Sensitivity (Average Power)	Sen.			-26	dBm	3
Input Saturation Power (overload)	Psat	-3			dBm	
LOS Assert	LOSA	-36			dB	4
LOS De-assert	LOSD			-27	dBm	4
LOS Hysteresis	LOSH	0.5	2	6	dBm	

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

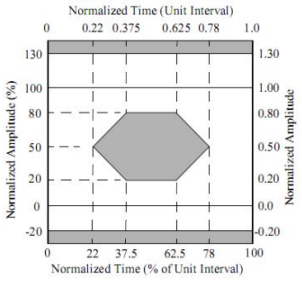
Notes:

[1] Measure at 2^7-1 NRZ PRBS pattern

[2] Transmitter eye mask definition.

[3] Measured with Light source 1550nm, ER=9dB; BER =＜10^{-12} @PRBS=2^7-1 NRZ

[4] When LOS de-asserted, the RX data+/- output is High-level (fixed).



Digital diagnostic Functions

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8472 Rev10.2 with internal calibration mode.

Table5-Digital Diagnostic Functions

Parameter	Symbols	Min.	Max.	Unit	Notes
Temperature monitor absolute error	DMI_ Temp	-3	3	degC	Over operating temp
Supply voltage monitor absolute error	DMI _VCC	-0.15	0.15	V	Full operating range
RX power monitor absolute error	DMI_RX	-3	3	dB	
Bias current monitor	DMI_ bias	-10%	10%	mA	
TX power monitor absolute error	DMI_TX	-3	3	dB	

Pin Description

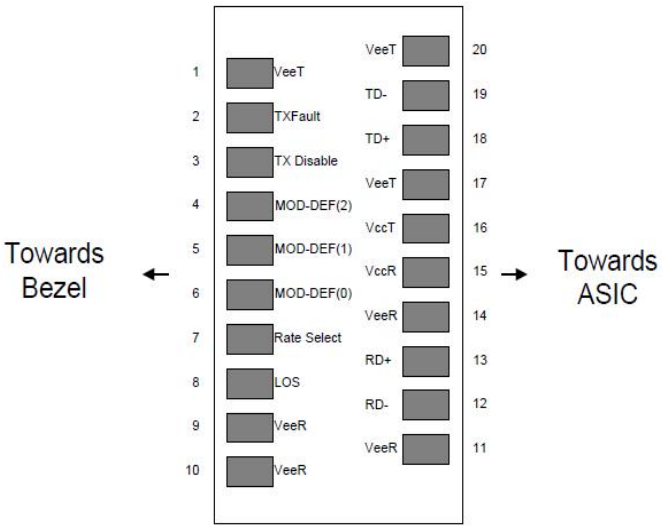


Figure1 Pin view

Pin Function Definitions

Table6-Pin Function Definitions

PIN	Name	Description	Notes
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.Open Drain. Logic "0" indicates normal operation.	
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required.	4
8	LOS	Loss of Signal indication. Open Drain. Logic "0" indicates normal operation.	5
9	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
10	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out(CML). AC Coupled	
13	RD+	Receiver Non-inverted DATA out(CML). AC Coupled	
14	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

[1] Circuit ground is internally isolated from chassis ground.

[2] Laser output disabled on TDIS＞2.0V or open, enabled on TDIS＜0.8V.

[3] Should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF (0) pulls line low to indicate module is plugged in.

[4] This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates).If implemented, the input will be internally pulled down with＞30kΩ resistor. The input states are:

1) Low (0 – 0.8V): Reduced Bandwidth

2) (＞0.8, ＜2.0V): Undefined

3) High (2.0 – 3.465V): Full Bandwidth

4) Open: Reduced Bandwidth

[5] LOS is open collector output should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Mechanical Outline

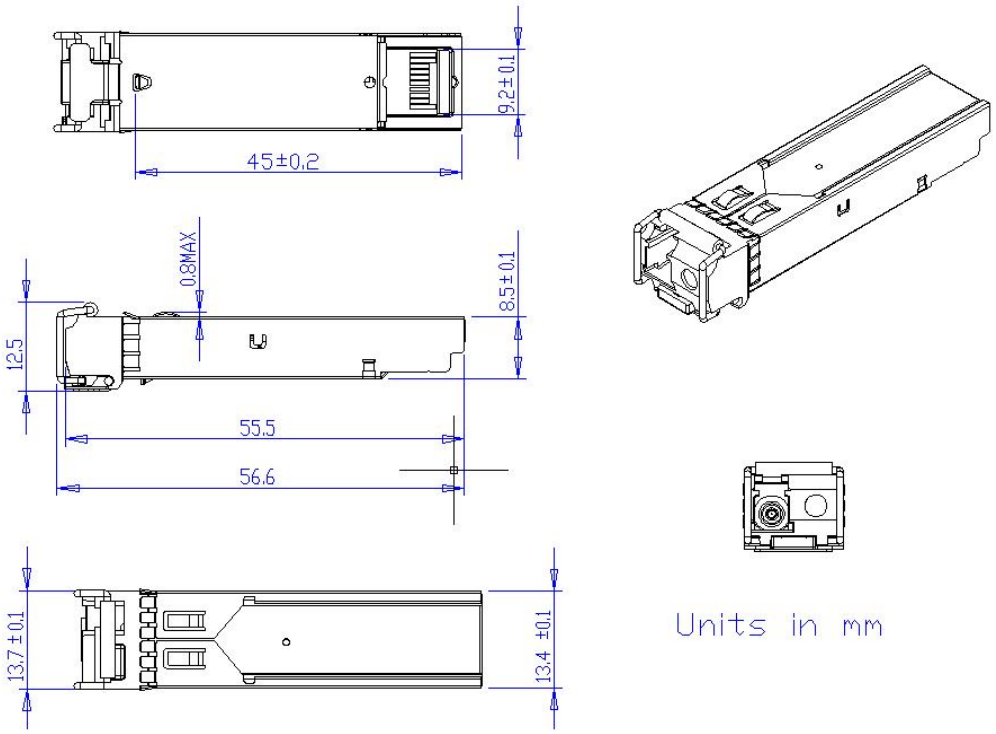


Figure2 Mechanical Outline

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Disclaimer

1. We are committed to continuous product improvement and feature upgrades, and the contents contained in this manual are subject to change without notice.

2. Nothing herein should be construed as constituting an additional warranty.

3. NADDOD assumes no responsibility for the use or reliability of equipment or software not provided by NADDOD.